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DE-PS 8 75 461
DE-PS 2 44 439
DE-AS 10 50 232
DE-OS 22 27 282
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DE- GM 18 58 565
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㉗ Cover Brace

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Patent Claims

1. Cover brace, consisting of two pivoting arms that pivot with respect to each other and interconnected with each other at a first joining point, each of which can be directed on one end at a second or third joining point on a movable part of the furniture, as a cover or similar dedicated lock position, in which both of the arms in hinged position essentially are lying next to each other, into a second stop position facing an opening of the cover or similar dedicated position, in which both of the arms are in an essentially out-stretched position, whereby at the first joining point on the one arm a cam surface is planned that has an effect in conjunction with a contact surface on the other arm with lower spring effect, and whereby the cam surface contains at least two successive cam sections in the direction of swing of the one arm around the first joining point, *thus signifies* that the contact surface (21'') is formed by one end of the slider (21) that can move lengthwise of the other arm (1) against the effect of the spring element and that the one cam section (29), upon swinging of the arms (1, 2) with respect to each other through its interaction with the contact surface (21'') by moving the slider against the effect of the spring element (22), brings about a breaking of the cover's movement or the like, while the other cam section (28) on the contact surface (21'') encounters a stop in order to break the opening movement of the cover or the like.

2. Cover brace in accordance with claim 1 contains thereby that arms (1, 2) are manufactured from flat or bonding material.

3. Cover brace in accordance with claim 1 or 2 thus signifies that the contact surface (21'') contains a molding or a cut (31) that is at least in part adapted to the shape imparted by the other cam section (28), one side surface (31) of which forms a contact surface creating a stop for the other cam section (28).

4. Cover brace in accordance with claim 3 thus signifies that the side surface (31') forming the contact surface lies in such a relation to the path of movement of the other cam section (28) that forces exerted on the side surface (31') by the other cam section (28) run at a diagonal to the direction of slide (*L*) of the slider.

5. Cover brace in accordance with claim 3 or 4 thus signifies that the cut (31) is open toward one side in a horizontal direction toward the direction of slide (*L*) of the slider (21) or in the direction of movement of the other cam section (28) and that on the other side of the cut (31) a stop surface is provided.

6. Cover brace in accordance with claims 3 through 5 thus signifies that the cut (31) is moved to the side opposite a line (*L*) running through the first joining point (3) and in the direction of slide of the slider (21), whereby the side surface (31') of the cut (31) serving as a stop surface (31') lies in the area of this line (*L*) or right next to this line.

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7. Cover brace in accordance with one of the claims 1 through 6 thus signifies that both cam sections (28, 29) are arranged shifted toward each other around the first joining point (3) by about 150°.

8. Cover brace in accordance with 7 thus signifies that the one cam section (29) is flared out wider and/or contains a greater radius of curvature than the other cam section (28).

9. Cover brace in accordance with claim 8 thus signifies that the maximum peripheral space distance of the one cam section (29) from the first joining point (3) is greater than the maximum peripheral space of the other cam section (28) of this joining point.

10. Cover brace in accordance with one of the claims 1 through 9 thus signifies that the one arm (2) on its end (2'') containing the first joining point (3) is bent or curved.

11. Cover brace in accordance with one of the claims 1 through 10 thus signifies that the joining points (3, 8, 9) form a triangle and that in a cover brace attached to a piece of furniture the first joining point (3) is located on the side of the connecting line facing the inside of the furniture between the second and third joining point (8, 9).

12. Cover brace in accordance with claim 10 or 11 thus signifies that the bent end (2'') of the one arm (2) is oriented toward the connecting line between the second and third joining point (8, 9).

13. Cover brace in accordance with one of the claims 3 through 12 thus signifies that a slide (30) that stretches laterally from the cut (31) or the lateral surface (31') constituting the stop surface contains the contact surfaces (21'') and on it the one cam section (29) slides when swiveling the arms (1, 2) from the first stop position to the second stop position and vice versa with momentary compressing and subsequent relaxing of the spring element (22).

14. Cover brace in accordance with claim 13 thus signifies that a preferably peripheral surface (33) running in a straight line is planned between the cam sections (28, 29) on the one arm (2) and the slide (30) elastic lies against it in the second stop position and stops the arms (1, 2) in this stop position.

15. Cover brace in accordance with one of the claims 1 through 14 signifies by means (30, 34) that stop the arms (1, 2) at intermediate points between the first and the second stop position.

16. Cover brace in accordance with claim 15 thus signifies that the means of at least one of the preferably straight line peripheral surface (34) planned in the area of the first cam section (29) are provided, against which the se (30) lies elastic at an intermediation point of the arms (1, 2) and at least in a middle section of the first joining point (3) has less spacing than in the areas on both sides of this middle section.

17. Cover brace in accordance with one of the claims 1 through 16 thus signifies that the spring element (22) is a spring arranged in a cut (25, 26) of the slider (21).

18. Cover brace in accordance with claim 17 thus signifies that the spring (22) is housed in one of this arm's cut that

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(23) that stretches lengthwise (*L*) of the other arm (1) and that the spring (22) supports itself on one end against the end of the cut (23) that is facing the first joining point (3) and on the other end against the slider's (21) support surface (27).

19. Cover brace in accordance with claim 18 thus signifies that a fitting or nose (24) at least on one end of the cut (23) a locking cam or lobe (24) is planned that juts into the end of this spring for mounting the spring (22).

20. Cover brace in accordance with one of the claims through 19 thus signifies that the contact surface (21") and the slider (21) consist of plastic.

16. *The invention has to do with a cover brace, consisting of two pivoting arms that pivot with respect to each other and are interconnected at a first joining point, each of which can be directed on one end at a second or third joining point on a movable part of the furniture, as a cover or similar dedicated lock position, in which both of the arms in hinged position essentially are lying next to each other, into a second stop position facing an opening of the cover or similar dedicated position, in which both of the arms are in an essentially out-stretched position, whereby at the first joining point on the one arm a cam surface is planned that has an effect in conjunction with a contact surface on the other arm with lower spring effect, and whereby the cam surface contains at least two successive cam sections in the direction of swing of the one arm around the first joining point.*

Cover braces serve mainly to hold in an open position or stop covers or lifting doors of furniture that can swivel around a horizontal axis from a lock position into an open position and vice versa.

Besides securing or stopping in the open position cover braces, moreover, also have the task of slowing down an opening or closing cover, lifting door or the like.

A window brace (DE-PS 2 44 439) is familiar that consists of two interconnected arms that pivot around each other at first joining point, which may be drawn in on each of their free ends located at a distance from the joining point in a second or third joining point on a window frame or on a window. The one arm in the area of the first joining position is equipped with a flat shaped swivel head the circumferential line of which forms cam sections. The other arm has a U-shaped cross section with two sides arranged at a distance from each other and parallel that overlap the swivel head. On the yoke of the other arm that connects the two sides together is attached a leaf spring stretching lengthwise the arm and anchored on one end with the other end forming a contact surface that elastic abuts against the cam section of the swivel head.

By means of the leaf springs interacting with the cam sections

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three preferred positions for the arms result in the familiar window brace, that is a first stop position, in which both the arms in hinged position lie essentially right next to each other, and that is dedicated to the window's lock position, a second stop position, in which both the arms have an essentially elongated position that is dedicated to the opening the window, as well as an intermediate position in which the arms encompass an angle with each other of about 90°. What is not advantageous in the familiar window brace is mainly that a defined stop position of both arms is not assured, i.e. the arms under repeated deforming of the leaf spring may swivel past the second stop position with respect to each other. Another disadvantage in the familiar window brace is that this essentially demonstrates no braking effect, i.e. for example when swiveling both arms from the intermediate position to the second stop position at first it is necessary to stretch the leaf spring, *however even before reaching the second stop position the leaf spring loses tension again*, so that due to the spring's loss of tension even a speeding up of the swivel movement results before reaching the second stop position. The familiar window brace is hardly suitable for furniture if only for the reasons given.

Furthermore, the familiar window brace requires a relatively expensive production process, because the swivel head that forms the cam sections must be manufactured as a separated part and connected to the one arm and for the other arm a U-shaped cross-section is required.

The basis of the invention is to highlight a familiar type of cover brace that with the chance of simple and economical manufacturing guarantees a reliable stopping of both arms particularly in the stop position dedicated to the opening of the cover as well as effective slowing down of movement of the cover and the like.

As a solution to this problem a cover brace of the type depicted in the beginning was designed as in the invention that the contact surface is formed by one end of a slider that moves lengthwise along the other arm against the effect of a spring element and the one cam section when swiveling the arms toward each other through its interaction with the contact surface while moving the slider against the effect of the spring element brings about a slowing down of the movement of the cover or the like, while the other cam section comes up against a stop in order to limit the opening movement of the cover or the like.

The invention-related cover brace can be used optionally in covers or the like that are swiveled around a horizontal axis from the lock position into the open position upwards or downward. In both cases in the invention-related cover brace a slowing down of the movement of the cover or the like is achieved in order to avoid too hard hitting of a cover or the like on a piece of furniture when locking or a too swiftly slowing down of the cover in the open position. Through the interaction of the slider with the spring element a relatively great spring path may be reached that allows for creating the necessary spring power when slowing down.

Furthermore, this great spring path contributes to)

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even with longer use of the cover brace and the sign of wear that inevitably arise with this there are sufficient breaking powers available.

Furthermore the invention-related cover brace insures that the completely opened cover or the like is maintained or stopped in the open position and a further swivel of the cover or the like is effectively avoided.

The invention-related cover brace may be produced from a few simple parts. It is in particular also possible to prepare both the arms from brass as simple punchings.

Furthermore the invention-related cover brace may also be so developed that only a defined and locked open position of the cover brace or the alike may be achieved with it, but at the same time the cover brace or the like when locking and by means of a cover brace shortly before reaching the final locked position bottom dead center effect is pushed into the definitive closing position and maintained there.

With the invention-related cover switch three functions may be thus carried out without difficulties and they are: locking in the open position place, maintaining in the closed position as well as slowing down of the cover or the like when closing or opening.

Suitable further developments of the invention are the subject of the secondary claims.

Below the invention will be commented on using these figures. It shows

Fig. 1 in perspective representation a cover brace according to the invention disassembled;

Fig. 2 in perspective representation and cut lengthwise a slider for use with the cover brace according to Fig. 1;

Fig. 3 side view of the cover brace according to Fig. 1 along with a furniture body and a cover that will pivot mounted on this furniture body in the shape of a lifting door and with the lifting door being closed;

Fig. 4 a representation similar Fig. 3, but with open lifting door;

Fig. 5 in detailed representation the arms of the cover brace in the area of the first joining point, with partly opened cover brace or lifting door;

Fig. 6 a side view the cover brace according to Fig. 1 along with a piece of furniture and a cover opening downward hooked onto this furniture with closed cover;

Fig. 7 a similar representation like Fig 6, yet with opened cover;

Fig. 8 in detail representation the arms of the cover brace I the area of the first joining point, with partly opened cover.

The cover brace represented in the figures consists of two interlocking arms 1 and 2, that for example are manufactured from punching of flat or band shaped material and on an end connected by a bolt joint 3 that forms the first joining point. The joint bolt 3 in the simplest case consists of a rivet that is a bolt through bores 4 and 5 of arms 1 and 2 and afterwards riveted down. On their other end are arms 1 and 2 with help of joint bolts 8 and 9, that form the second or third joining point and extend through bores 6 or 7

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at joints 10 and 11, whereby the fitting part serves as the anchor to the mounting of the cover brace on a fixed furniture part formed by a furniture side wall 12 of furniture 13. The fitting part 10 is developed yoke-shaped or U-shaped and has on its yoke surface a bore 14 for the joint bolt 8. The fitting part 11 serves as anchor on the inner surface of the lifting door 15 or the cover 16 and is formed by a slab with a angled mounting link that has a bore 17 for the joint bolt 9. The fitting parts 10 and 11 are anchored by means of bolts 18 that reach through the screw holes 19 or 20 of the fitting parts on the furniture side wall 12 or on the lifting door 15 or cover 16.

In the represented embodiment the arm 1 is developed in a straight line and bears a slider 21 movable lengthwise along the arm and preferably of plastic based casting that is forward loaded toward the joint bolt 3 by means of a pressure spring 22. The pressure spring rests in a rectangular cut 23 that also stretches along the longitudinal axis *L* of the arm 1. The cut 23 is equipped with definable cams 24 on both its ends that simplify insertion of the pressure spring 22 and that can reach into the coiled pressure spring 22.

For guiding the slider 21 on the arm 1 the latter has a cut 25 that is set to the cross cut of the arm 1, continuous, rectangular and stretches lengthwise the slider.

Since the slider 21 should also simultaneously encompass the pressure spring 22, the cut 25, on its surfaces contiguous with the surface sides of the arm 1, is equipped with groove-like lateral extensions 26 that also stretch along the longitudinal axis *L* and are open to the slider's 21 face 21' that is farther from joint bolt 3. The expansions 26 are closed to the slider's face, which neighbors the joint bolt 3, and form there a support surface 27 for the end of the pressure spring (22) that faces the joint bolt 3.

The arm 2 is bent or curved on its end that has the bore 5, i.e. the arm 2 consists of a section 2" running in a straight line and a curved section or end 2", which has the bore 5 for the joint bolt.

In the area of bore 5 the arm 2 is flared out and has two cam sections 28 and 29 there that rest on a plane with arm 2 and extend laterally away from the end 2" or from the bore 5. Both cam sections 28 and 29 are thus by about 150° shifted about the bore toward each other, whereby the first cam section 29 is considerably more broadly flared out than the second cam section 28. Cam section 29 or its peripheral area furthermore also has a maximum distance from the bore 5, that is greater than the corresponding maximum distance of the peripheral area of cam section 28.

As Fig 3 to 7 indicate, the face of slider 21 directed toward the joint bolt 3 forms a contact surface 21 for cam sections 28 and 29 on arm 2, whereby this contact surface forms an essentially smooth slide 30 that runs diagonally across the longitudinal axis *L*, and a cut or depression 31 that is in the shape of a trough and is adjacent to this slide and is open both to joint bolt 3 as well as to a side

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of slide 21 in a direction diagonal to the longitudinal axis *L*.

The trough-shaped cut 31 is mainly in its peripheral surface akin to the slide 30 adaptable to the mold of the smaller cam section 28 and runs diagonally to the direction of movement that the cam section makes in swiveling its arm 2 around joint bolt 3 in relation to arm 1, that peripheral surface 31' of cam section 28 in swiveling arm 2 in relation to arm 1 may not be overrun, but rather serves as contact surface for cam surface 28 if arms 1 and 2 for example assume the stop position shown in Fig. 4.

This effect is even more pronounced by the fact that cut 31 with regard to the longitudinal axis *L* that runs through the joining points formed by joint bolts 3 and 8, is shifted to one side or lengthwise of slider 21, in a way that in a position of arms 1 and 2 corresponding to Fig. 4 the resulting force exerted on the peripheral surface 31' by the cam surface 28 essentially runs diagonally to the longitudinal axis *L* and thus may not move the slider 21 against pressure spring 22.

While peripheral surface 31' thus serves as a contact surface for cam section 28, this surface may be overrun by the considerably more widely flared out cam section 29 when swiveling the lifting door 15 or the cover 16 from the closed position shown in Fig. 3 or 6 into the open position shown in Fig 4 or 7, while moving the slider 21 in the direction of longitudinal axis *L* or in the direction of arrow *A* and against the effect of pressure spring 22.

The putting together of the cover brace is effected this way: at first the pressure spring 22 is set into the cut 23, and in so doing in such a way that the setting cams 24 hold down the pressure spring in this cut. Now the slider 21 is pushed onto arm 1 with the facing surface 21' forward in such a way that the arm 1 comes to rest in cut 25 of the slider 21. Slider 21 is at this time pushed so far against the effect of pressure spring 22, which is supported at one of its ends against the support surface 27 and at its other end against the end of cut 23 that is turned away from joint bolt 3, that arm 2 may be directed into arm 1 by means of joint bolt 3. After securely fastening the joint bolt 3, e.g. by riveting, slider 21 is released and it then presses with its facing surface forming contact surface 21" against arm 2 by means of the pressure spring 22 in the area of cam sections 28 and 29. Now occurs the directing in of arms 1 and 2 at their other end onto the fitting parts 10 and 11 by means of joint bolts 8 and 9.

As the Fig. 3 and 4 or 6 and 7 show, the invention-related cover brace may be used both with lifting doors 15 that are opened upwards by pivoting around a horizontal axis as well as with covers 16 that are opened downward by pivoting around the horizontal axis. With lifting doors 15 it is not absolutely necessary for the doors to rest in a horizontal position when open. Far more desirable here is a slight tilt on the lifting door 15 in question so as to remain within the reach of the service person.

With covers 15 on the other hand an open position remaining horizontal is desired, since the opened covers

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16 in furniture as a rule should also serve as additional shelf space. The varying position or tilt of the lifting door 15 and the cover 16 will be achieved by appropriate application of fitting pieces 10 and 11 on the side wall of the furniture 12 or on the inner surface of the lifting door 15 or cover 16.

In both cases, however, the cover brace is fastened onto the furniture 13 or on the lifting door 16 in such a way that at least with an open lifting door 15 or cover 16 the three joining points made up of the three joint bolts 3, 8 and 9 form a triangle wherein the general joint bolt 3 for arms 1 and 2 rests on the dedicated inner furniture side of the connector line between joint bolt 8 and 9.

The way the cover brace works may be described as follows:

In the close position of the lifting door 15 shown in Fig. 3 the cam section 29 rests against the side surface 31' of the cut 31 in such a way that pressure spring 22 tries to pivot the arm to joint bolt 3 clockwise and thus the lifting door 15 pushes into the close position and holds fast there. Should the lifting door 15 now be opened by pivoting around the joint bolt 32, then the cam section 29 runs over the lateral surface 31' in the manner described while simultaneously moving the slider 21 in the direction of the arrow *A* and then slides on the slide 30 until finally the cam section 28 rests in the cut 31 with the lifting door 15 opened completely. Slide 30 at this time presses against a peripheral surface 33 of the arm 2 between cams 28 and 29 running in a straight line. Since this peripheral surface 33 contains a lesser distance from the joint bolt than the peripheral of cam section 29, the lifting door 15 is held in the open position as in Fig. 4 by the cover brace or by the slider 21 with spring tension pressing against the peripheral surface 33, whereupon going beyond the position as per Fig. 4 and opening the lifting door 15 is blocked by means of the cam section 28 bearing against the side surface 31'.

When closing the lifting door 15 and with the related swiveling of arm 2 with respect to arm 1 around the joint bolt 3 the peripheral surface 33 once again get out of contact with the slide 30, on which the cam section 29 slides under increasing compression of the pressure spring 22 until the cam section 29 fall into the cut 31 or presses against the side surface 31' and the pressure spring 22 with simultaneous shifting of the slider 21 in a direction against the arrow *A* may at least partly lose tension.

In this way it is guaranteed that the lifting door 15 presses firmly against the furniture 13 by means of the cover brace in the close position and shortly before reaching the close position by the slider 21 on its own is pushed into this position and furthermore is also held in the open position by means of the interaction of the peripheral surface 33 with the slide 30.

Since moreover the pressure spring 33 when closing the lifting door 15 is increasingly compressed by the cam section 29 on the slide, appropriate dimensioning of the pressure spring 22 may simultaneously achieve using the cover brace to maintain the lifting door 15 in virtually any and every open position or when swiveling the lifting door 15 out of the maximum open position shown in the Fig. 4 to the close position shown in the Fig. 3 a breaking effect occurs.

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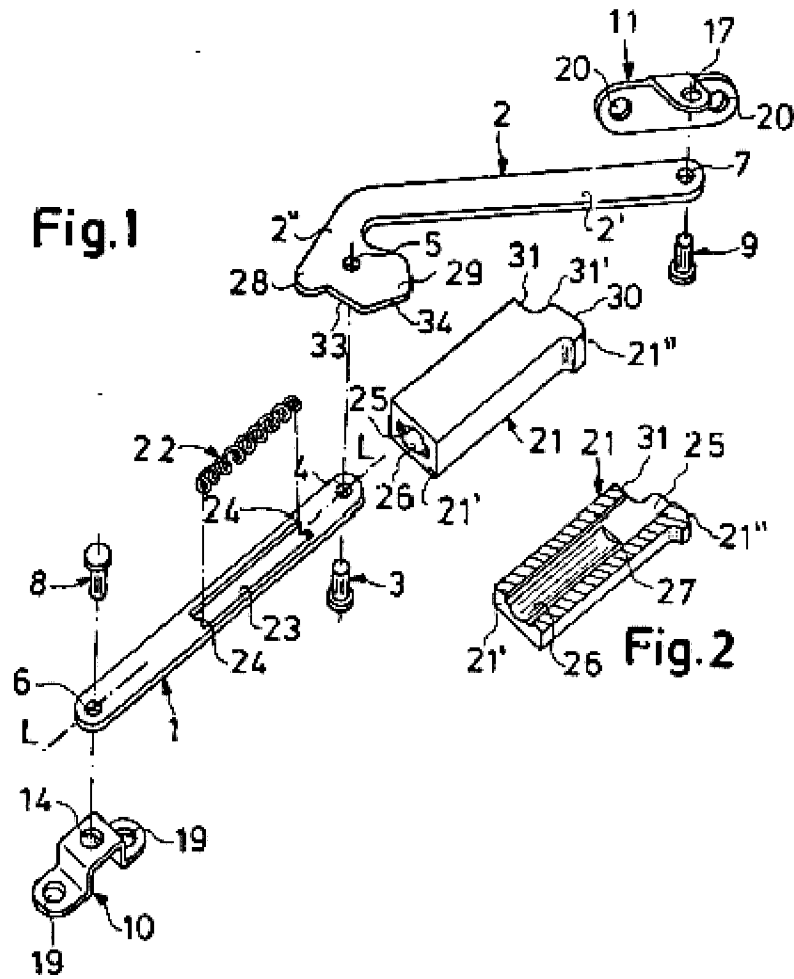
The holding in place or stopping of the lifting door 15 in the intermediate positions, i.e. in places between the maximum open position and the close position, may also be further enhanced by equipping the cam section 29 as well with one or more peripheral surfaces that run in a straight line that then interact in a similar way as the peripheral surface 33 with the slide 30 of the slider 21 (Fig.5).

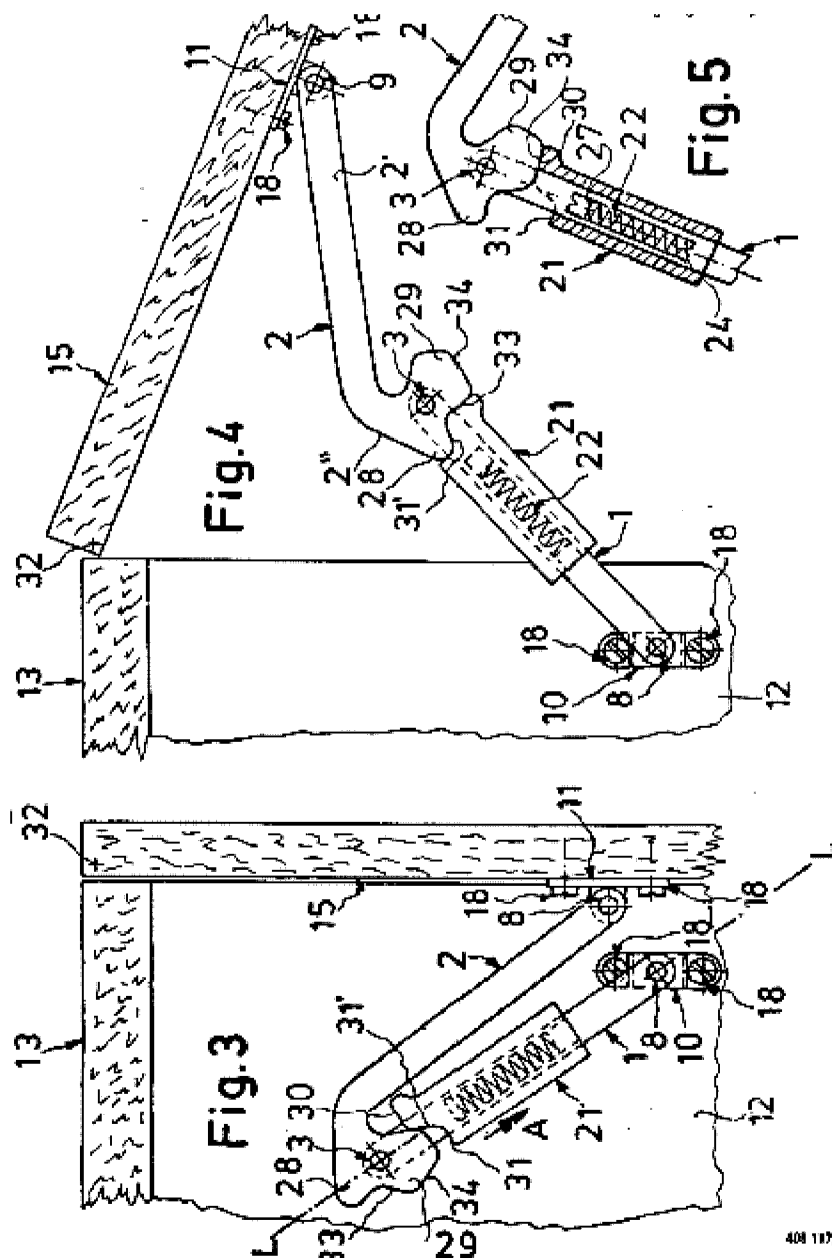
With the use of the cover brace for the cover 16 pivoting about a horizontal axis 35 the way in which the cover brace works is quite similar, wherein even here once again the cover 16 is pushed into the close position shown in Fig. 6 and held there by the slider with the 'latches effect' while pressing against the cam section 29 with the side surface 31'. The

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maximum open position of the cover 16 shown in Fig. 7 is determined by the cam section pressing against the side surface 31' of the cut 31, wherein by additional peripheral surfaces 34 running in a straight line on the cam section 29 intermediate positions for the cover may be achieved in which the cover 16 is stopped (Fig 8) from falling down or from swiveling around the axis 35. A breaking effect when opening the cover 16 is achieved in this instance by the cam section 29 having a greater distance from the joint bolt 3 at its transition point 29' to the peripheral surface 33 than at the peripheral surface 34 so that this transition point 29' may only be overridden by compressing the pressure spring 22 or under a shift of the slider 21 in the direction of the arrow *A* on the slide.

Attached herewith 3 sheets drawings





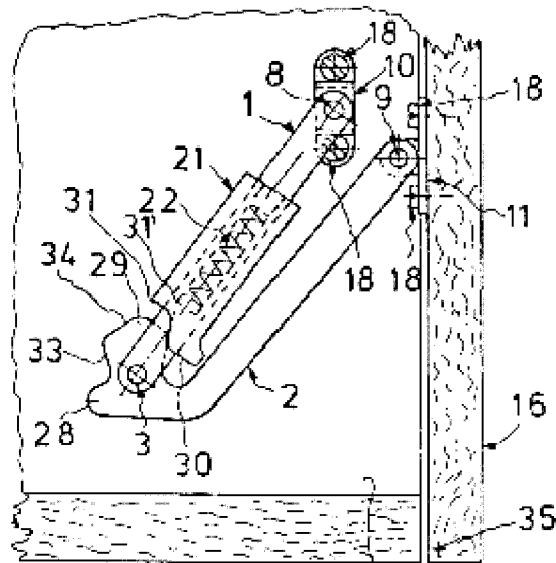


Fig. 6

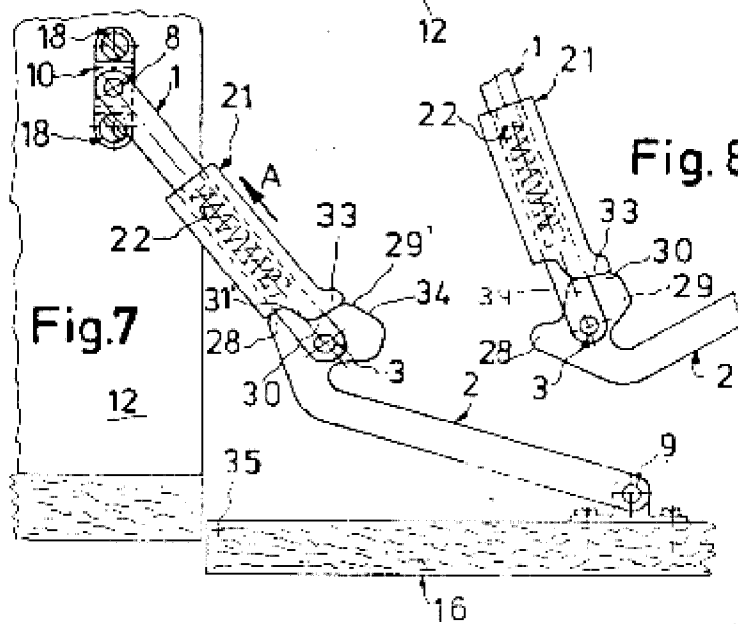


Fig. 7

Fig. 8